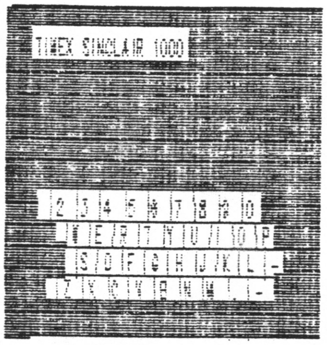
APRIL 1992 NEWSLETTER
NEXT MEETING: APRIL 29,1992
(At home of Fred Lewis, see below)

# CAPITAL DISTRICT TIMEX/SINCLAIR COMPUTER CLUB

# ALBANY, NEW YORK




OUR CLUB MEETINGS ARE HELD AT THE CAPITAL DISTRICT PSYCHIATRIC CENTER, 75 NEW SCOTLAND AVENUE, ALBANY, NEW YORK IN ROOM 37. OUR MEETINGS ARE NOW HELD FOUR TIMES A YEAR, FEBRUARY, MAY, AUGUST AND NOVEMBER ON THE THIRD WEDNESDAY OF THE MONTH AT 7:30 - 10 PM. However the next meeting, Wednesday, April 29 will be at home of Fred Lewis, see text below.

FOR INFORMATION, COMMENTS OR CONTRIBUTIONS TO THE NEWSLETTER PLEASE CONTACT CLUB PRESIDENT FRED LEWIS, 5 SHERWOOD PARK DR., BURNT HILLS, NY 12027, TELEPHONE (518) 399 5038

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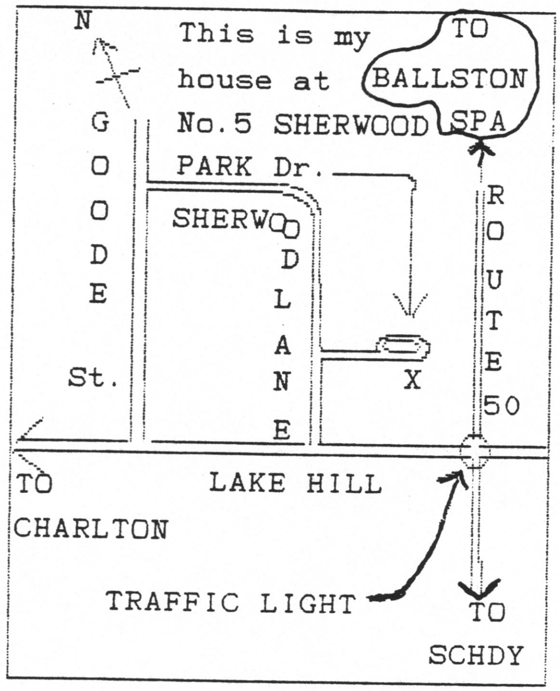
The coming meeting was postponed to accommodate members who would otherwise not have been able to attend. It will be held at my house (Fred Lewis) because demonstrations that are planned will use too much equipment, including three computers, VCR etc. not easily transported.

In keeping with the traditions of our little club the next meeting will be devoted to demonstrations that will compare the performances of three computers: a Timex TS-1000, a Timex 2068 and an IBM compatible PC. It has always been my contention that the ZX-81/TS-1000 was not a toy but a truly powerful computer capable of impressive tasks even though handicapped by a slow chip and rather crude graphics capabilities. In past demonstrations I have shown an impressive spinning globe, with continents and oceans, even having dancing waves, rotating steadily at speeds up to 60 RPM - all on the unadorned TS-1000 with 64K RAM. At this next meeting I will show a program that simulates a globular star cluster, one of the most impressive members of our Universe, with orbiting stars. Real globular star clusters are light years in diameter, have millions of star members and orbit times of typically a million years. My model demos are restricted to only a few stars with dynamic, interacting orbits. This program will be run on all three computers to compare the speed and graphics. The TS-1000 does an impressive job. Also included will be demonstrations of the Mandelbrot fractals with demonstrations of very impressive 16 color fractals on the PC but also what I think is impressive are the same fractals, in 12 gray scale shades that were created on the TS-1000. A monumental accomplishment for such a tiny computer. The meeting is devoted to showing that the ZX-81/TS-1000 still lives. Directions to my house are attached as well as a couple of graphics to whet your appetite.

## DIRECTIONS TO FRED LEWIS

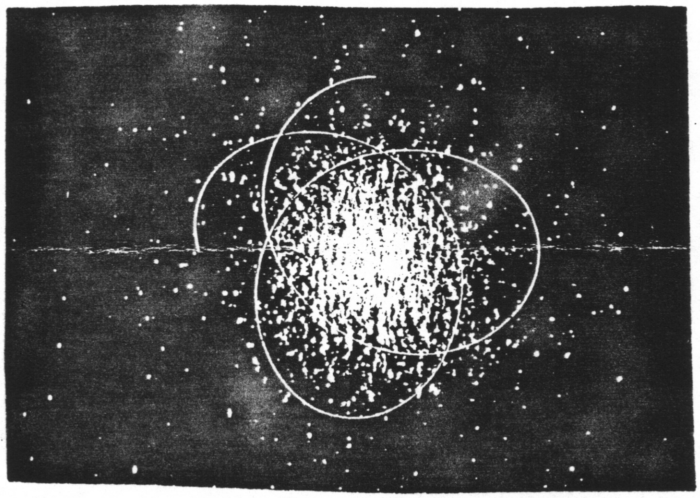
Traveling north on route 50 make a left on Lake Hill at the traffic light, center of Burnt Hills. On Lake Hill, go only 0.2 mile and take first right on Sherwood Lane. Go another 0.2 mile and take another first right on Sherwood Park Dr. This is a closed loop shaped like a figure "9". My house, No. 5 is at the far right part of the circle. Name Lewis on mail box. Brick house with white front area.

# BURNT HILLS

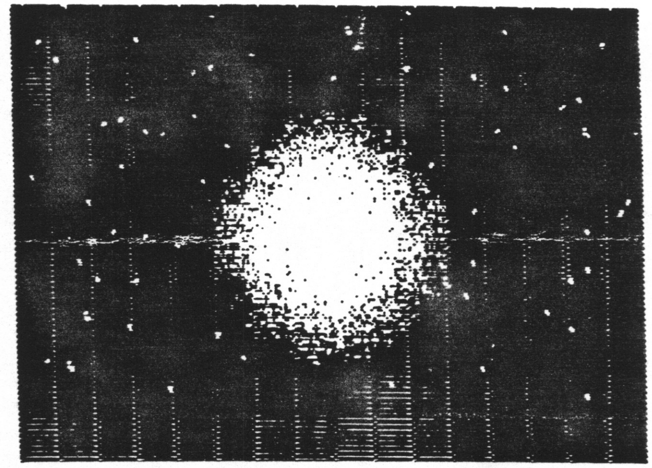


# GLOBULAR STAR CLUSTER SIMULATION

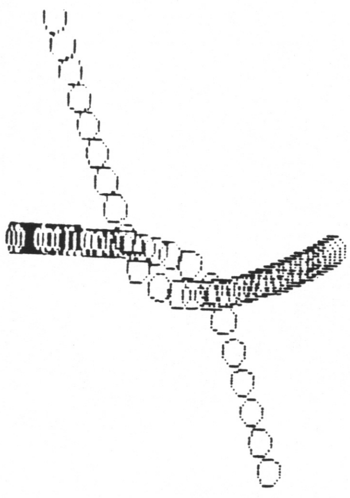
A computer model has been developed to simulate globular star clusters. Programs have been run on the TS-1000, timex 2068 and an IBM compatible PC to compare speed and graphics. These fascinating structures consist of up to a million stars in mutually interacting orbits that form spherical clusters that are typically 150 light years in diameter. THey are relatively stable, generally billions of years old and lose or gain star members slowly.



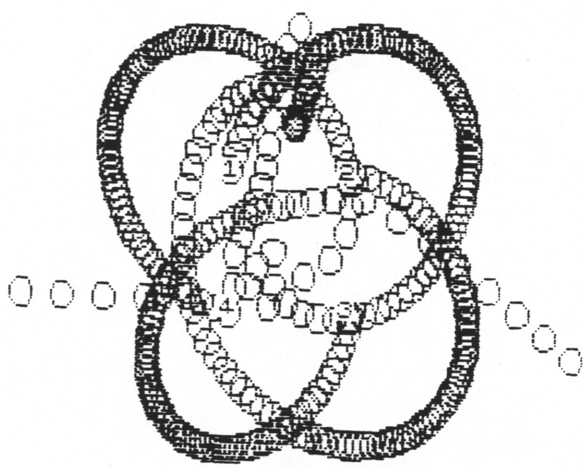
Messier 13 (Hercules) 500,000 stars
Trace line is typical orbit.
Orbit time 1,000,000 years.



TS 2068 simulated cluster
32,400 stars.



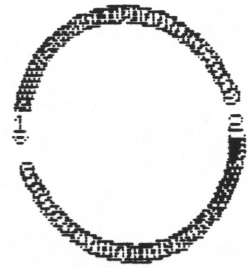
Demo: "Slingshot" acceleration.



Unstable 4-star system.

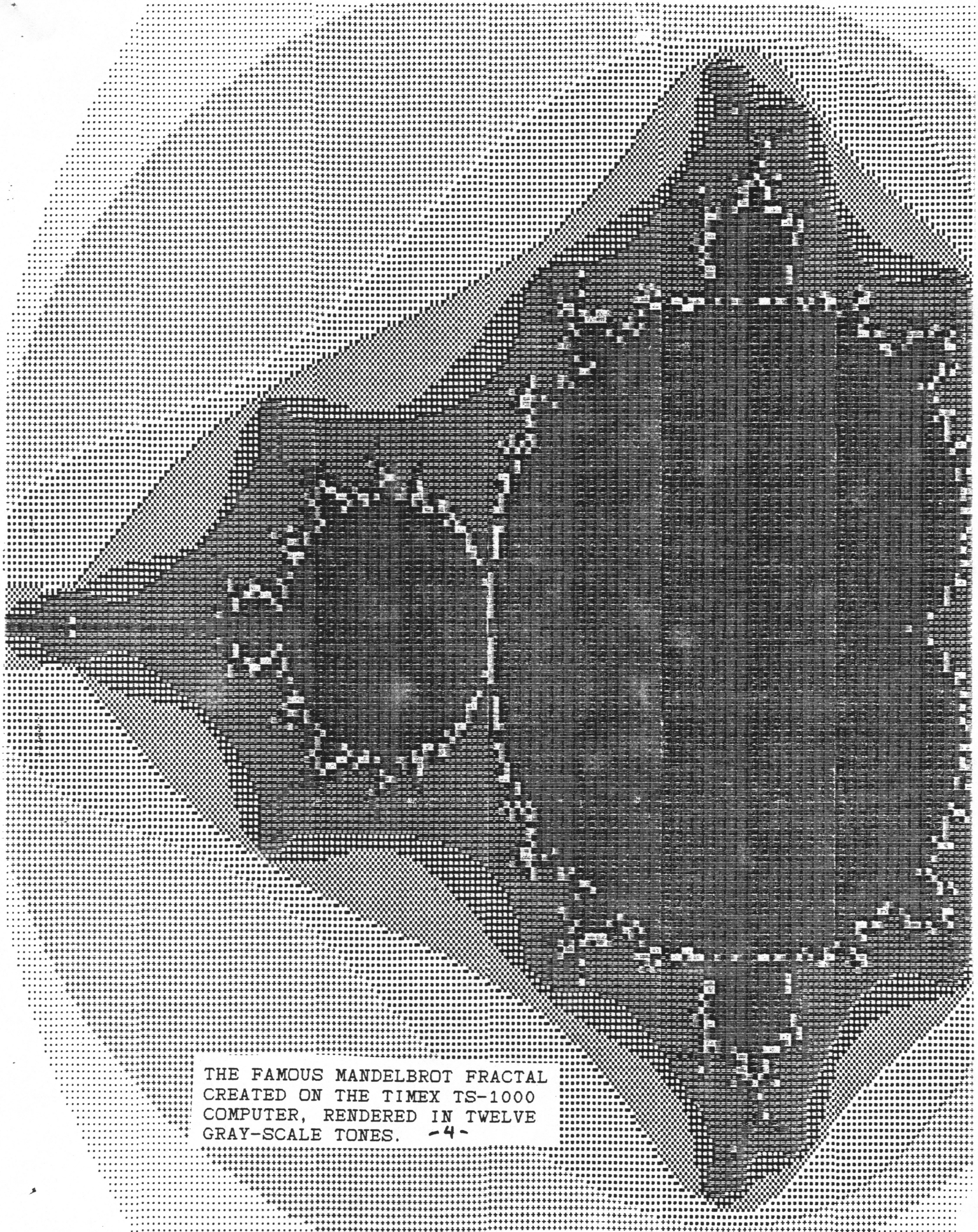
We have achieved stable binary and moderately stable 4-star systems. No stable systems with 5 or more stars or with non-concentric orbits have been formed.

Additional topic: Basic flaws in digital computers.



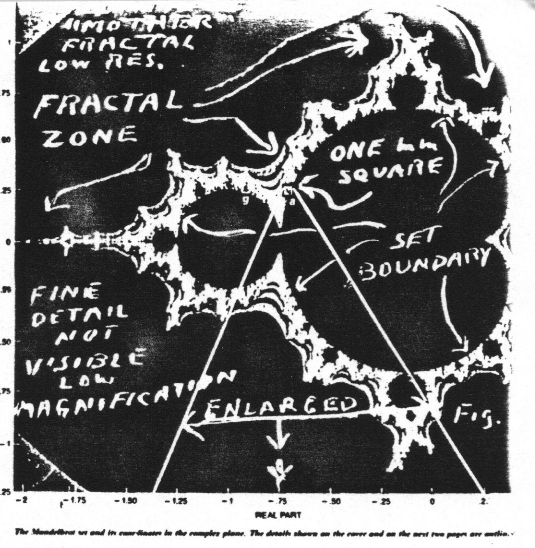
Binary stars.

4-Star system.

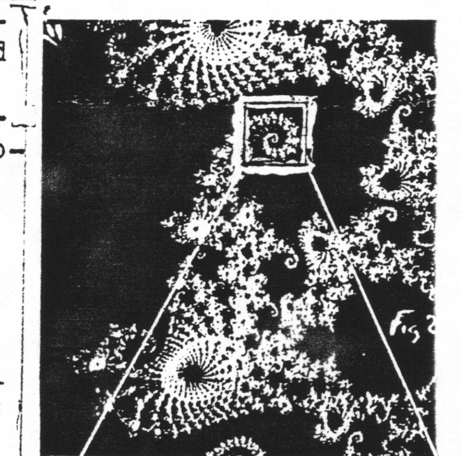


THE FAMOUS MANDELBROT FRACTAL CREATED ON THE TIMEX TS-1000 COMPUTER, RENDERED IN TWELVE GRAY-SCALE TONES.

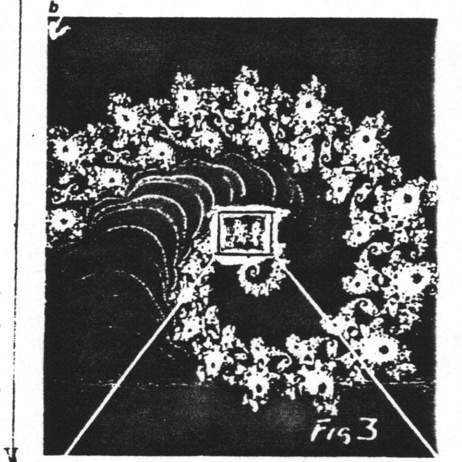
# IBM PC ORIGINALS *COPIED from* →

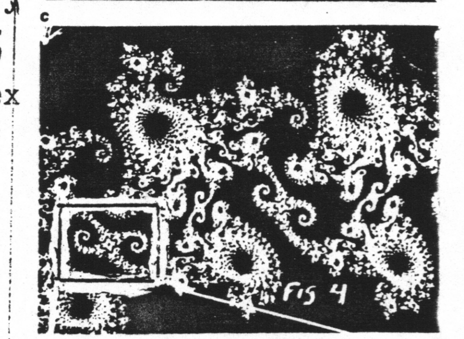


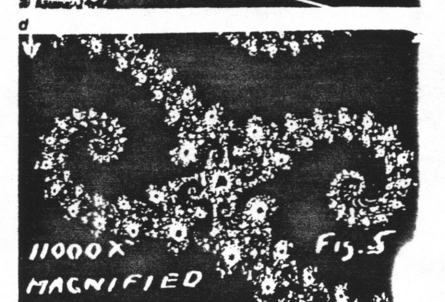

This demo is an attempt to duplicate the complex and beautiful Fractal patterns from Scientific American, August 1985 using only a TS-1000 computer and 2040 printer. In addition a simulated Hi-Res graphic technique is demonstrated involving photocopying a large composite print with size reduction to hide pixel detail. The original Fractal pictures (shown reduced in size and monochrome in Figs. 1-5) are IBM PC ten-color, 400x400 pixel Fractal images. Respectable equivalents made on a TS-1000 computer are shown in Figs. 6 thru 9. A major feature of a Fractal is that the coarse structures (low magnification) always contain invisible fine structure that is qualitatively similar to the coarse pattern. As each magnified section is further enlarged additional detail appears. This scaled replication can proceed without limit revealing an infinite number of finer and finer details that approach zero in dimension. The practical limit on a computer (with double precision) is the production of images that represent detail smaller than the nucleus of an atom. At this enormous magnification there are still complex tendrils swirling out in elaborate curliques. This feature is illustrated in Figs. 1-5 in which a one mm square is magnified successively to 11000x. The phenomenon is also seen in the TS-1000 pics in which a tiny section of Fig. 6 is magnified in Figs 7 to 9. Fig.1 (also Fig. 6) is a small scale map of the entire available fractal area (the mother fractal) and the hidden detail cannot be seen until magnified.




Fractals can be generated in many ways. The one used here involves the "Mandelbrot set" which is the set of complex numbers that remain finite after any number of iterations of the process of squaring and adding complex numbers. To wit: Let Z= a complex number, initially zero. Let C=a complex number representing a point in the complex plane. Let $Z=Z^2+C$. Repeat (loop) until the "size" of $Z > 2$. The "size" is simply the value of the vector from the origin to the point in the complex plane. The size of sequential values of Z never exceeds 2 if derived from a value of C in the Mandelbrot set. All others go screaming off to infinity, but for values (C) immediately outside the set boundary the RATE of growth is unstable and Z-size actually oscillates wildly causing erratic fluctuations in the value of N, the no. of iterations for Z to "escape". This "N" is plotted (Fig. 1) as a "surface elevation" in the complex plane. The 3-D surface thus produced is infinitely "crinkled" in the narrow unstable zone and contour lines (or areas) formed by joining similar values of N (ranges of values for contour areas) permit the fractal surface to be visualized. And so the Fractal images displayed consist of plots of color (or gray scale density) in a complex plane, the position coordinates of which are the real and imaginary parts of the complex number defining the map position of the pixel. For the TS-1000 pictures, Figs. 6 thru 9, a 200X200 pixel field was computed (2-3 days) and stored in a data matrix (64 K RAM) then printed out in the form of six printerstrips 24 inches long. These were cut and glued to form a 19X24 inch image which was photocopied with reduction. Ten colors became ten shades of gray.




 HAPPY COMPUTING Fred Lewis

# TS-1000 FRACTAL IMAGES

The picures on this page were all made from Timex 2040 printer copy computed on the unadorned TS-1000. A 40K stored data matrix (64k RAM) was printed to six 24 inch strips that were assembled into glued-up pictures 19X24 inches. The large prints were photocopied with reduction to the size shown. Which is a neat way to get fancy stuff out of a crude printer. Each image required two to three days computing time depending on the complexity of the image. (Carefully avoiding voltage spikes, power outs and wiggly RAMS).

It seems that, given enough time, the lowly Timex computer can be made to do almost anything- the demonstration of which has become a personal challenge and pastime.

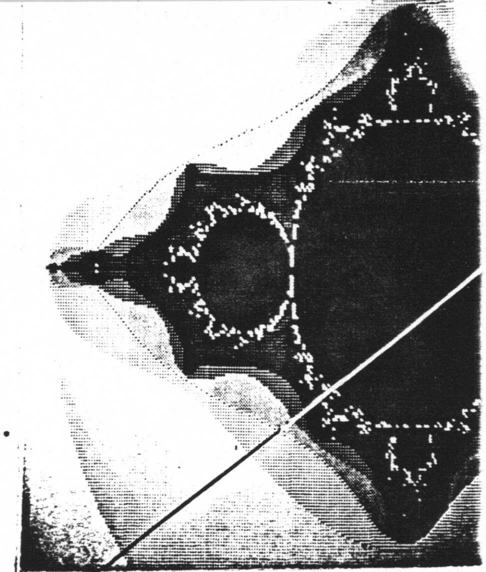


Fig. 6- Complete Mandelbrot set. Duplicates Fig from Sci. Am. article.

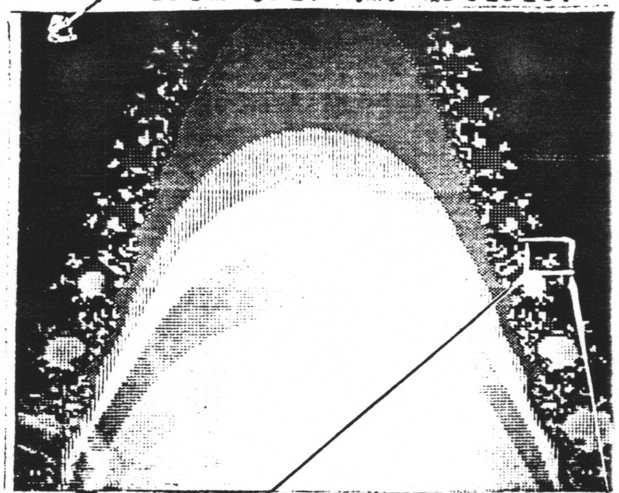


Fig. 7- Enlarged section from indicated area. Fine detail beginning to appear.

Note: The original photocopies of the images were more dramatic than the rather poor Xerox copies necessary for reproduction. Each image has ten to twelve gray-scale shades that do not really show up in a Xerox copy

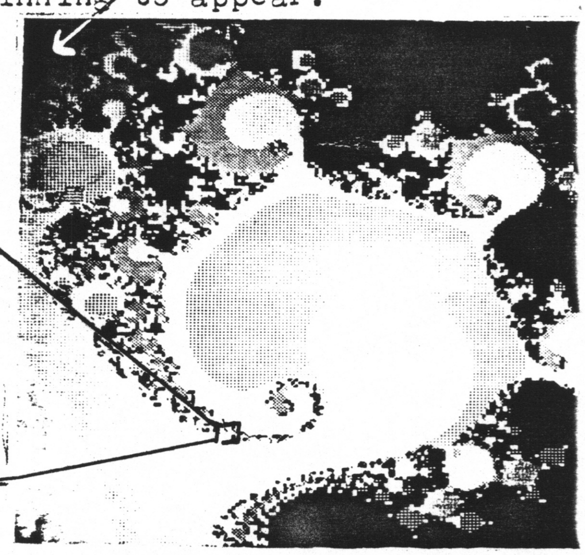


Fig. 8- Third enlarged area.

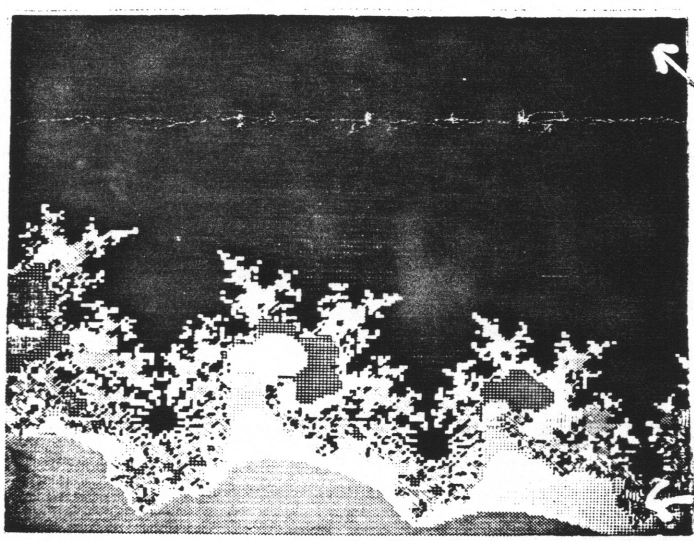


Fig. 9- Microstructure that is still over 100,000,000X larger than the finest structure that can be developed on a computer with double precision.